

Remarks/Arguments

Claims 25 and 39 have been amended. Claims 32 and 46 have been canceled without prejudice. Please charge any fees for the newly added claims or any other fees for entry of this Amendment to our Deposit Account 03-3415

The Examiner has rejected applicants' claims 25, 27-28, 31-36, 39, 41-42 and 45-50 under 35 USC 103(a) as being unpatentable over the Black (U.S. Pat. No. 6,307,956) patent in view of the Yguerabide, et al. (U.S. Pat. No. 6,586,193) patent and further in view of either the Schmidt, et al. (U.S. Pat. No. 7,094,531) patent or the Lockhart, et al. (U.S. Pat. No. 6,344,316) patent. Applicants have amended applicants' independent claims 25 and 39 and with respect to these claims, as amended, and their respective dependent claims, the Examiner's rejections are respectfully traversed.

Applicants' independent claim 25 has been amended to recite an authentication system for personal authentication which is used together with an authentication certificate on which a DNA array reacted with a gene obtained from a given person is attached, the DNA array carrying a plurality of DNA probes corresponding to plural kinds of genes in a predetermined order, the system comprising: storage means for storing registration information which includes layout information representing a hybridized pattern of reacted DNA array, acquisition means for reading the hybridization pattern of a reacted DNA array attached on an authentication certificate and acquiring layout information from the hybridization pattern, and controlling means for executing a process comprising the steps of: (i) generating authentication information on the basis of the layout information acquired by the acquisition means, and (ii) collating the authentication information with the registration information as a reference stored in the storage means, and making authentication, wherein a plurality of

different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA, and each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA. Applicants' independent claim 39 has been similarly amended. The use of DNA probes indicative of a person's MHC genes or SNPs, as recited in applicants' amended independent claims 25 and 39, allows the number of DNA probes for realizing personal authentication to be reduced, thus reducing the amount of data required for personal authentication. See applicants' page 12, line 23 to page 16, line 24.

The constructions recited in applicants' amended independent claims 25 and 39 are not taught or suggested by the cited art of record. In particular, none of the cited references teach or suggest use of a plurality of different DNA probes, wherein each of the plurality of different DNA probes is indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA.

The Black patent discloses use of biometric properties, including fingerprints, retina or DNA, for identity verification, and further discloses using arrays of immobilized single-stranded DNA (ssDNA) probes, or DNA chips, for genetic analysis for disease detection, toxicology, forensics, industrial processing and environmental monitoring. Col. 4, lines 18-40; Col. 7, lines 50-60; Col. 24, line 66-Col. 25, line 35. Black does not mention using DNA probes that are indicative of any specific types of genes or groups of genes, and in particular of using DNA probes indicative of a person's MHC genes or SNPs.

The Yguerabide, et al. patent discloses using single-stranded DNA probes for “crosslinking” two or more single-stranded targets and using two or more single-stranded DNA probes to bind to different sites on the same target single-stranded DNA. In Yguerabide, et al., each of the probes has a labeling means, e.g. light scattering particles, attached thereto which can be detected using appropriate means, such as by solid phase methods. See, Col. 83, line 53-67; Col. 84, lines 12-25; Col. 86, lines 34-52. The Yguerabide, et al. patent does not teach or suggest using DNA probes that are indicative of MHC genes or SNPs, i.e. single nucleotide polymorphisms, and, instead, only generally mentions that in applications to DNA, its detection methods for detecting analytes combined with hybridization methods can be used for detecting, measuring and analyzing “genes, polymorphisms, linkage patterns, gene mutations, abnormal genes, other associated sequences.” Col. 99, line 67 – Col. 100, line 7.

The Lockhart, et al. and the Schmidt, et al. patents are also completely silent as to use of DNA probes that indicate a person’s MHC genes or a person’s SNPs by whether or not each of the probes is reactive or non-reactive to the person’s DNA. The Lockhart, et al. patent discloses a method of identifying nucleic acid abundance in one or more DNA samples by hybridizing the DNA sample with one or more probe arrays to produce a reacted DNA array, and determining the hybridization pattern of the reacted DNA array. See, Abstract; col. 16, lines 60-64; col. 20, lines 57-67; col. 21, lines 8-18. Lockhart, et al. further discloses use of labels, such as fluorescent dyes or radiolabels, attached to DNA samples and/or to the probe arrays for identifying the DNA samples and/or the probe arrays to which they are attached, so as to determine the hybridization pattern of the reacted DNA array. The Schmidt, et al. patent discloses a method of sequencing a single-stranded DNA molecule by ligating hybridization probes, each of which includes an identifying label or tag, to a DNA primer and then

determining the sequence of the DNA primer based on the identity of the labels or tags carried by the probes hybridized with the DNA primer. See col. 1, lines 30-47, col. 2, lines 26-45; col. 3, lines 21-31 and col. 4, lines 10-21.

Thus, both the Lockhart, et al. and the Schmidt, et al. patents disclose methods of hybridizing DNA samples with probes or probe arrays that include identifying labels or tags to produce reacted DNA arrays, and identifying the DNA sequence or hybridization pattern using the labels or tags. Neither Lockhart, et al. nor Schmidt, et al. mention detection of MHC genes or SNPs or use of DNA probes that indicate a person's MHC genes or SNPs.

Accordingly, applicants' amended independent claims 25 and 39, each of which recites each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA, and their respective dependent claims, patentably distinguish over the combination of the Black, Yguerabide, et al., Lockhart, et al. and Schmidt, et al. patents.

In view of the above, it is submitted that applicants' claims, as amended, patentably distinguish over the cited art of record. Accordingly, reconsideration of the claims is respectfully requested.

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